Overview of application of matrices in engineering science

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ABSTRACT: - **Engineering Mathematics is applied in our daily life. Applied Mathematics is future classified as vector algebra, differential calculus, integration, discrete Mathematics, Matrices& determinant etc. Matrices have a long history of application in solving linear equations.**
In between 300BC & 200Ad, Mathematics says the first example of the use of matrix methods to solve simultaneous equations, including the concept of determinants. In this paper we will study overview of application of matrices in engineering science.

Keywords: **Matrices, Determinant,B.C,A.D,Differential, calculus, Integration, discrete mathematics.**

I INTRODUCTION

A Matrices is a two dimensional arrangement of numbers in row and column enclosed by a pair of square brackets or can say matrices are nothing but the rectangular arrangement of numbers,expression,symbols which are arranged in column and rows.

Matrices find many applications in scientific field and apply to practical real life problem.

Matrices can be solved physical related application and one applied in the study of electrical circuits, quantum mechanics and optics, with the help of matrices, calculation of battery power outputs, resistor conversion of electrical energy into another useful energy, these matrices play a role in calculation, with the help of matrices problem related to Kirchhoff law of voltage and current can be easily solved.

Matrices can play a vital role in the projection of three dimensional images into two dimensional screens, creating the realistic decreeing motion. Now day's matrices are used in the ranking of web pages in the Google search. It can also be used in generalization of analytical motion like experimental & derivatives to their high dimensional. The most important usages of matrices in computer side application are encryption of message codes with the help of encryptions only, internal function are working and even could work with transmission of sensitive & private data.

Matrices are also used in geology for seismic survey and it is also used for plotting graphs. Matrices used in Statistics plays a vital role in scientific studies.

Matrices are also used in robotics & automation in terms of base elements for the robot movements. The movements of the robots are programmed with the calculation of matrices 'row &column "Controlling of matrices are done by calculation of matrices.

II HISTORY AND USES OF MATRICES

First concept of Mathematics was applied on around 1850 A.D but its used were applicable in ancient era. The Latin word of matrix is worm. It can also mean more generally any place which something form or produced.

The scientist understand that the originality of matrix came from the study of system of simultaneous linear equation between 300 B.C and 200 Ads and the Nine chapter of Mathematics art 9Chin ChaungSuanshu) gives the first known example of use of matrix.

Graph theory:- The application of matrices as a finite graph is a basic motion of graph theory, Linear combination of quantum statics also referred linear combination of quantum static also referred to as matrices mechanics and the first model of quantum mechanics by Heisenberg in 1925

Computer Graphics:-computer graphics are also utilize by the 4x4 transformation rotation of matrices.

Solving linear equation:-
Using row reduction
Cramer's Rule (Determinant)
Using the inverse Matrices
Using the inverse matrices
Matrices are also used in cryptography

Application of Matrices in write, encodes, decode and send secret message:-
Mathematics puzzles, games, government and military organization websites financial information like credit card number and bank account, information security, all related encode, decode, theory a secret message in which matrices play a very important role.

<u>The coding, decoding are also utilizing</u>

1) Steganography
2) Cryptography

Steganography:- Matrices are used to cover channels, hidden tent within web pages, hidden files in plain sight, null ciphers and steganography.
In recent wireless internet connection through mobile phone, known as wireless application protocol (wap) also utilize matrices in the form of stenography.

Cryptography:- Cryptography also utilize matrices, cryptography is science of information security, the word cryptography derive from word Krypto's which means hidden. These technologies hide information in storage or transits.

<u>In the Encryption process</u>:- First text of the message into a steam of numerical rules and the place the data into a matrices and multiply the data by the encoding matrices at last convert the matrices into a steam of numerical values that contains the encrypted message.

III SAMPLE EXAMPLES TO SOLVE THE MATRICES

Example: If A=$\begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}$and B =$\begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$, then find the value of AB.

Solution: We have

$$AB = \begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix} \times \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} (1)(2) + \ (2)(2)(1)(1) + \ (2)(3) \\ (-2)(2) + \ (3)(2)(-2)(1) + \ (3)(3) \end{bmatrix}$$

$$= \begin{bmatrix} 6 & 7 \\ 2 & 7 \end{bmatrix}$$

Example: If $A = \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$ then find the value of A×A.

Solution: $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$

$$A \times A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix} = \begin{bmatrix} 9 & 8 & 8 \\ 8 & 9 & 8 \\ 8 & 8 & 9 \end{bmatrix}$$

IV CONCLUSION

Application of matrices is not only graph theory, stenography, cryptography. But now a day's its application are almost every field of engineering science,banking,communication,military,admistration ,confidential message,transducer,computerized lockers etc. Still lot of research and development are required in this filed

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